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UNITED STATES PATENT AND TRADEMARK OFFICE

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10/772,643	02/05/2004	Roger Keith Stager	ALA-PT012	5771

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/772,643	STAGER ET AL.
	Examiner	Art Unit	
	Farhan M. Syed	2165	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on <u>26 April 2007</u>.

2a)☐ This action is **FINAL**.　　2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-18 and 20-39</u> is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>39</u> is/are allowed.

6)☒ Claim(s) <u>1-18 and 20-38</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

DETAILED ACTION

1.   Claims 1-18 and 20-39 are pending.

Allowable Subject Matter

2.   Claim 39 is objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the

base claim and any intervening claims.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4.   Claims 1-18 and 20-38 are rejected under 35 U.S.C. 102(e) as being anticipated

by Kedem (U.S. Patent 6,725,331).

As per claims 1, 10, 14, 20, 21, 26, and 35 Kedem teaches a system for

providing continuous data protection (i.e. *"As discussed above, there are other types of dynamic*

resource assignments that the storage system may employ in addition to dynamically assigning some

targets as hot spares. Another example involves a feature provided in the SYMMETRIX line of disk arrays

known as "dual copy" or "business continuance volumes" ("DC/BCVs")." "After the copy is made, the

storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time" ""Alternatively, once the need for a point-in-time copy of the logical volume ceases, the DC/BCV volume can be dynamically assigned to another logical volume, or can be kept idle and available for use to make a point-in-time copy of another logical volume." The preceding text clearly indicates that continuous data protection is the business continuance volumes. Kadem states that a connection MAY be de-established, but does not state that connection must be disconnected, as the Applicant argues. Furthermore, an active, idle connection may also exist, as Kadem point out. Therefore, · the continuity of data protection is clearly anticipated by Kadem.)(Column 5, lines 66-67; column 6, lines 1-4, lines 11-13, lines 25-30), the system comprising: a host computer (i.e. *"Typically, data in a mass data storage system is accessed from a host computer in units called "logical volumes," with the host computer writing or reading data to the storage system using a logical volume address or "logical device volume number" (hereafter DV#)."*)(Column 1, lines 29-33); a primary volume for storing data written by the host computer (i.e. *"Alternatively, it is possible in many systems to configure each physical storage device to store two or more logical volumes." "One example of this involves the dynamic assignment, during operation, of one or more of the system's physical devices (e.g., a disk drive or a portion thereof) to store a particular logical volume."* The preceding text clearly indicates that a primary volume is one logical volume that stores data, which stored on a physical storage device.)(Column 1, lines 35-37; lines 45-48); a secondary volume wherein writes made to the primary volume are sequentially duplicated onto the secondary volume (i.e. *"As discussed above, a statically configured DC/BCV logical volume (e.g., DV2) may be dynamically assigned as a DC/BCV copy of another logical volume in the system (e.g., DV0 or DV1). When a DC/BCV assignment is made, the volume of which a copy is made (e.g., DV0 or DV1) is referred to as the "primary" DC/BCV volume, and the DC/BCV volume (e.g., DV2) that makes the point-in-time copy is referred to as the "secondary" DC/BCV volume."* The preceding text clearly indicates that sequentially duplicated is a copy between the primary and secondary volume.)(Column 17, lines 51-58), the secondary volume

containing a chronological ordering of all writes made to the primary volume (i.e. *"It should*

be appreciated that many storage systems employ mirroring techniques for fault tolerance and

performance reasons. For example, to protect critical data from equipment malfunction or other events

that could result in a loss of data, many data storage systems are configured to store multiple mirrors of

the same logical volume on two or more disk adapter targets, most typically on different drives. When a

logical volume is written, the write is carried out to all mirrors of the logical volume" The preceding text

clearly indicates that when mirroring takes place, an ordinary person skilled in the art understands that

mapping of the two logical volumes must occur for the mirroring to take place. Thereby, any and al writes

are chronologically ordered (i.e. mirrored) between the two volumes.)(Column 5, lines 3-13); and a data

protection system configured to manage the duplication of writes to the secondary

volume and to map data between the primary volume and secondary volume using data

structures, wherein the data structures are maintained so that within the established

time window (i.e. *"As discussed above, a statically configured DC/BCV logical volume (e.g., DV2) may*

be dynamically assigned as a DC/BCV copy of another logical volume in the system (e.g., DV0 or DV1).

When a DC/BCV assignment is made, the volume of which a copy is made (e.g., DV0 or DV1) is referred

to as the "primary" DC/BCV volume, and the DC/BCV volume (e.g., DV2) that makes the point-in-time

copy is referred to as the "secondary" DC/BCV volume. In the embodiment of the invention shown in

FIGS. 9A-B, the entries in the GDAT/LDAT of table 500 differ for the primary and secondary DC/BCV

volumes." "Thus, the embodiment of the GDAT/LDAT illustrated in Figs. 9A-B includes a field that

identifies which mirror of the secondary logical volume is to be established as a mirror of the primary

logical volume." As previously mentioned that mirroring of two logical volumes clearly anticipates the

mapping of two volumes within an established window. Furthermore, the GDAT/LDAT is merely an

illustration of a secondary volume making a point-in-time copy with the primary volume.)(Column 17, lines

50-57; column 18, lines 21-30), the primary volume may be restored to any point in time

within the time window (i.e. *"After the copy is made, the storage system may de-establish the*

connection to create a snapshot of the contents of the copied logical volume at a particular point in time. The snapshot copy can then be used to perform various operations (e.g., making a backup of the data or generating a report based on its contents) without disrupting or holding up access to the logical volume that was copied. When the desired operations have been completed, the logical connection between the DC/BCV logical volume and the copied logical volume may be reestablished, so that the DC/BCV volume can be updated with all changes that occurred to the copied volume while the logical connection had been de-established. In this manner, the DC/BCV volume can be used to provide a copy of the logical volume at a later point in time." The Examiner notes that a later point in time is an instance of any point in time.)(Column 6, lines 11-25).

As per claims 2, 16, 22, and 27, Kedem teaches a system wherein the point-in-time map is created by creating a full mapping between the primary volume and secondary volume (i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a loss of data, many data storage systems are configured to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time."*)(Column 5, lines 5-9; column 6, lines 11-14).

As per claims 3, 28 and 36, Kedem teaches a method further including the step of retaining particular points in time beyond the APIT window (i.e. *"Alternatively, once the need for the point-in-time copy of the logical volume ceases, the DC/BCV volume can be dynamically assigned to another logical volume, or can be kept idle and available for use to make a point-in-time copy of another logical volume."*)(Column 6, lines 25-29).

As per claims 4, 29 and 37, Kedem teaches a method wherein a point-in-time map is created by creating a full mapping between the primary volume and secondary volume for a point that is retained beyond the APIT window (i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a loss of data, many data storage systems are configured to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time." "Alternatively, once the need for the point-in-time copy of the logical volume ceases, the DC/BCV volume can be dynamically assigned to another logical volume, or can be kept idle and available for use to make a point-in-time copy of another logical volume.")*(Column 5, lines 5-9; column 6, lines 11-14, lines 25-29).

As per claims 5, 12, 17, 25 and 30, Kedem teaches a method wherein the full mapping is created by merging data structures ranging in time from time zero to a time when the snapshot was taken (i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a loss of data, many data storage systems are configured to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time.")*(Column 5, lines 5-9; column 6, lines 11-14).

As per claims 6, 13, 18, and 31, Kedem teaches a method wherein the full mapping is created by merging mapping data structures ranging in time from the time a point-in-time map created prior to the snapshot was taken to a time when the snapshot

was taken (i.e. *"For example, to protect critical data from equipment malfunction or other events that*

could result in a loss of data, many data storage systems are configured to store multiple mirrors of the

same logical volume on two or more disk adapter targets, most typically on different disk drives." "After

the copy is made, the storage system may de-establish the connection to create a snapshot of the

contents of the copied logical volume at a particular point in time.")(Column 5, lines 5-9; column 6, lines

11-14).

As per claims 7 and 33, Kedem teaches a method wherein data on the

secondary volume that is outside of the identified APIT window is discarded (i.e. *"Finally, a*

"not active mirror mask" field identifies which mirrors of the secondary volume (e.g., DV2) are not

established as mirrors of the primary volume (e.g., DV1) when a DC/BCV connection is established. This

entry "masks out" all mirrors of the secondary logical volume except for the one identified in the

secondary mirror number entry. These "masked out" mirrors are deactivated while the DC/BCV

connection is established, and are reactivated when the DC/BCV connection is de-established.")(Column

18, lines 49-57).

As per claims 8 and 34, Kedem teaches a method wherein data on the

secondary volume that is outside of the identified APIT window is phased out according

to a retention policy (i.e. *"Finally, a "not active mirror mask" field identifies which mirrors of the*

secondary volume (e.g., DV2) are not established as mirrors of the primary volume (e.g., DV1) when a

DC/BCV connection is established. This entry "masks out" all mirrors of the secondary logical volume

except for the one identified in the secondary mirror number entry. These "masked out" mirrors are

deactivated while the DC/BCV connection is established, and are reactivated when the DC/BCV

connection is de-established.")(Column 18, lines 49-57).

As per claims 9 and 32, Kedem teaches a method further comprising the step of periodically creating point-in-time maps to reduce a number of data structures that are needed when performing a restore (i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a loss of data, many data storage systems are configured to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time." "Alternatively, once the need for the point-in-time copy of the logical volume ceases, the DC/BCV volume can be dynamically assigned to another logical volume, or can be kept idle and available for use to make a point-in-time copy of another logical volume."*)(Column 5, lines 5-9; column 6, lines 11-14, lines 25-29).

As per claims 11, 24 and 36, Kedem teaches a method wherein a snapshot is taken at a particular point in time within the identified time window (i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a loss of data, many data storage systems are configured to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the storage system may de-establish the connection to create a snapshot of the contents of the copied logical volume at a particular point in time." "Alternatively, once the need for the point-in-time copy of the logical volume ceases, the DC/BCV volume can be dynamically assigned to another logical volume, or can be kept idle and available for use to make a point-in-time copy of another logical volume."*)(Column 5, lines 5-9; column 6, lines 11-14, lines 25-29) and a full mapping of the primary and secondary volumes for the particular point time is created (i.e. *"For example, to protect critical data from equipment malfunction or other events that could result in a loss of data, many data storage systems are configured to store multiple mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk drives." "After the copy is made, the storage system may de-establish the connection to*

create a snapshot of the contents of the copied logical volume at a particular point in time.")(Column 5,
lines 5-9; column 6, lines 11-14).

As per claim 22 and 38, Kedem teaches a method wherein the triggering step
includes inserting a marker into the write log, the marker indicating a time at which the
snapshot is taken (i.e. *"For example, to protect critical data from equipment malfunction or other
events that could result in a loss of data, many data storage systems are configured to store multiple
mirrors of the same logical volume on two or more disk adapter targets, most typically on different disk
drives." "After the copy is made, the storage system may de-establish the connection to create a
snapshot of the contents of the copied logical volume at a particular point in time.")*(Column 5, lines 5-9;
column 6, lines 11-14).

Response to Remarks/Argument

5.   Applicant's arguments filed 18 July 2006 have been fully considered but they are
not persuasive for the reasons set forth below.

Applicant argues:

(1) "Because the DC/BCV is disconnected from the logical volume for periods of
time, the DC/BVC is not able to provide <u>continuous</u> data protection as recited in the
present application."

The Examiner disagrees. In response to applicant's arguments, the recitation
"providing continuous data protection" has not been given patentable weight because
the recitation occurs in the preamble. A preamble is generally not accorded any

patentable weight where it merely recites the purpose of a process or the intended use

of a structure, and where the body of the claim does not depend on the preamble for

completeness but, instead, the process steps or structural limitations are able to stand

alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*,

187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

(2) "The Examiner equates mirroring with chronological ordering; these terms are

not equivalent. As known to one skilled in the art, a mirror of a drive is an exact copy of

the drive, including a copy of the logical structure of the drive."

According to the Microsoft Dictionary, 5th ed., mirroring in a network is a means

for protecting data on a network by duplicating it, in its entirety, on a second disk.

Therefore, by performing the steps of mirroring (i.e. duplicating), an instance of

chronological ordering must take place that duplicates (or "mirror") data from one disk to

the other disk.

(3) "Kedem fails to address the situation of what happens between the time a

copy is made to the DC/BCV and the later point in time; the present application is

directed to addressing this situation by providing continuous data protection."

The Examiner disagrees. The Application emphasis on "any point in time (APIT)", MAY

also include a later point in time and therefore is encompassed by APIT. A point in time

is a snapshot that may occur before, during, or after a give time, and since the

Examiner is given the broadest reasonable interpretation in light of the supporting

disclosure, and therefore Kedem teaches any point in time. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023,1027-28 (Fed. Cir. 1997). E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) (claims must be interpreted "in view of the specification" without importing limitations from the specification into the claims unnecessarily). In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320,1322 (Fed. Cir. 1989).

Hence, the Applicant's arguments do not distinguish over the claimed invention over the prior art of record.

Any other arguments by the applicant are either more limiting than the claimed language or completely irrelevant.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Farhan M. Syed whose telephone number is 571-272-7191. The examiner can normally be reached on 8:30AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 571-272-4146. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

FMS

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